REMARKS/ARGUMENTS

The Office Action mailed April 3, 2007 has been received and reviewed. Claims 10 through 31 are currently pending in the application. Claims 10 through 20 have been allowed. Claims 21 through 23 and 25 through 31 stand rejected. Claim 24 has been objected to as being dependent upon a rejected base claim, but the indication of allowable subject matter in such claim is noted with appreciation. Applicant has amended claims 11-14, 21, 25, 28 and 29. Reconsideration is respectfully requested.

Claim Objections

Claims 14, 16, 25, and 27 are objected to due to informalities in the claim language. Specifically, it was thought that the claims recited "EC" rather that "°C." Applicant submits that this apparent error is the result of a printing problem and not the claim language per se. For example, in the December 5, 2005 Amendment, the claims properly include "°C." The claims were not amended, yet the letters "EC" are present in the claims in the Amendments of April 28, 2006 and August 2, 2006. Applicant respectfully submits that no amendment is necessary as claims 14, 16, 25 and 27 already include the element "°C."

Applicant has amended claims 11 through 14 to improve the clarity of the claims as suggested by the Examiner.

Applicant has amended claims 21 through 25 as suggested by the Examiner.

Applicant has amended claims 21 and 26 through 29 as suggested by the Examiner.

35 U.S.C. § 112 Claim Rejections

Claims 22, 23, and 25 through 31 stand rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Applicant respectfully traverses this rejection, as hereinafter set forth.

It was asserted that the specification lacked support for applying a nitric acid solution at a concentration of 50-100% by weight as recited in claim 22. Applicant submits that page 8, lines

6-14 of the as-filed specification provides that the "nitric acid dip may preferably contain between about 50% and 100% by weight nitric acid, most preferably about 70% by weight."

It was asserted that the specification lacked support for applying a nitric acid solution for about 200 seconds as recited in claim 23. Applicant submits that page 8, lines 6-14 of the as-filed specification provides that the "duration of the nitric acid dip is preferably between about 10 seconds and 30 minutes, most preferably about 200 seconds."

It was asserted that the specification lacked support for applying a phosphoric acid solution at a temperature of between about 10-80 degrees Celsius as recited in claim 25. Applicant submits that page 8, lines 15-22 of the as-filed specification provides that the "phosphoric acid solution dip may be in a concentration between about 200:1 and 1:1 volumetric ratio of water to acid at a temperature of between about 10° and 80°C."

It was asserted that the specification lacked support for applying a phosphoric acid solution at a concentration of 200:1 as recited in claim 26. Applicant submits that page 8, lines 15-22 of the as-filed specification provides that the "phosphoric acid solution dip may be in a concentration between about 200:1 and 1:1 volumetric ratio of water to acid at a temperature of between about 10° and 80°C."

It was asserted that the specification lacked support for applying a phosphoric acid solution at a temperature of between about 10-80 degrees Celsius as recited in claim 27. Applicant submits that page 8, lines 15-22 of the as-filed specification provides that the "phosphoric acid solution dip may be in a concentration between about 200:1 and 1:1 volumetric ratio of water to acid at a temperature of between about 10° and 80°C."

It was asserted that the specification lacked support for applying a phosphoric acid solution for a time span of about 10 seconds and 10 minutes as recited in claim 28. Applicant submits that page 8, lines 15-22 of the as-filed specification provides that the "duration of the phosphoric acid solution dip is preferably between about 10 seconds and 10 minutes."

With respect to claims 29-31, it was asserted that the specification lacked support for applying a mixture of phosphoric acid and a fluorine-containing component. Page 9, lines 6-10 of the as-filed specification provides "components such as hydrofluoric acid (HF) and

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ammonium fluoride (NH₄F) may be used in lieu of the phosphoric acid solution or mixed with phosphoric acid for removal of the oxide polymer layer."

Applicant notes that the application generally discloses a two-step process for cleaning a via. While the discussion on pages 6-9 is generally directed toward cleaning a completed via, it is clear that the two-step process discussion on pages 6-9,"may also be effected during formation of a via." (Specification, Page 9, lines 11-12). Reconsideration and withdrawal of the rejection is requested.

35 U.S.C. § 103(a) Obviousness Rejection

Obviousness Rejection Based on WO 97/03469 to Krautschneider, referring to the English equivalent U.S. Patent 5,943,572 to Krautschneider, in view of U.S. Patent 5,511,020 to Hu

Claim 21 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Krautschneider (WO 97/03469), referring to the English equivalent U.S. Patent 5,943,572 to Krautschneider, in view of Hu et al. (U.S. Patent 5,511,020), hereinafter "Hu." Applicant respectfully traverses this rejection, as hereinafter set forth.

M.P.E.P. 706.02(j) sets forth the standard for a Section 103(a) rejection:

> To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, **the prior art reference (or references when combined) must teach or suggest all the claim limitations.** The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). (Emphasis added).

Krautschneider discloses a memory cell arrangement. A via is formed in a p-doped layer 2a. After formation of the via, a first dielectric layer 5 and first polysilicon layer 6 are deposited. (Krautschneider, col. 6, lines 1-30). An Si₃N₄ layer 7 is applied to the first polysilicon layer 6 and an SiO₂ layer 8 is formed. (Fig. 2, col. 6, lines 36-47). The Si₃N₄ layer 7 is removed with

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phosphoric acid. (Krautschneider, col. 6, lines 55-58). Portions of the first polysilicon layer 6 are removed to reveal an island stack of first polysilicon layer 6 and SiO$_2$ layer 8. (FIG. 3).

Hu is cited for teaching using polysilicon, silicide (metal containing polysilicon) and metal materials as floating gate electrodes in memory cells.

Claim 21 of the presently claimed invention recites a "method of fabricating a via in a dielectric layer and an underlying barrier layer for a semiconductor device, comprising: forming a partial via in the dielectric layer to expose at least portion of the barrier layer; cleaning the partial via with a phosphoric acid-containing solution; etching the barrier layer after the cleaning to form a full via having a metal containing trace on a bottom surface thereof; and applying a nitric acid-containing solution to the full via." Applicant respectfully submits that the proposed combination of Krautschneider and Hu fail to teach or suggest every element of claim 21 of the presently claimed invention.

Krautschneider and Hu fail to teach or suggest "forming a partial via in the dielectric layer to expose at least portion of the barrier layer." The Examiner contends that the first polysilicon layer 6 comprises the barrier layer. However, the first polysilicon layer 6 is deposited after formation of the via. (Krautschneider, col. 6, lines 1-30). Krautschneider and Hu also fail to teach or suggest "etching the barrier layer after the cleaning to form a full via having a metal containing trace on a bottom surface thereof; and applying a nitric acid-containing solution to the full via." Instead, Krautschneider teaches etching portions the first polysilicon layer 6 *with* a nitric acid containing solution. Krautschneider does not teach or suggest etching the first polysilicon layer 6 to form a full via having a metal containing trace of a bottom surface thereof, *and applying a nitric acid-containing solution to the full via* as recited in claim 21 of the presently claimed invention. Hu fails to cure the deficiencies of Krautschneider.

As the proposed combination of Krautschneider and Hu fail to teach or suggest every element of claim 21 of the presently claimed invention, Krautschneider and Hu cannot render claim 21 obvious. Accordingly, claim 21 is allowable.

Objection to Claim 24/Allowable Subject Matter

Claim 24 stands objected to as being dependent upon a rejected base claim, but is indicated to contain allowable subject matter and would be allowable if placed in appropriate independent form. Applicant respectfully submits that claim 21, from which claim 24 depends, is allowable in view of the cited art.

ENTRY OF AMENDMENTS

The amendments to claims 11-14, 21, 25, 28 and 29 above should be entered by the Examiner because the amendments are supported by the as-filed specification and drawings and do not add any new matter to the application.

CONCLUSION

Claims 10 through 31 are believed to be in condition for allowance, and an early notice thereof is respectfully solicited. Should the Examiner determine that additional issues remain which might be resolved by a telephone conference, he is respectfully invited to contact Applicant's undersigned attorney.

Respectfully submitted,

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Date: June 4, 2007
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